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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,619	05/25/2005	Joachim Christ	37742-97114	2228

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EXAMINER	
NGUYEN, XUAN LAN T	
ART UNIT	**PAPER NUMBER**
3683	

MAIL DATE	DELIVERY MODE
08/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/501,619	CHRIST, JOACHIM	
	Examiner	Art Unit	
	Lan Nguyen	3683	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-31* is/are pending in the application.

4a) Of the above claim(s) *15-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/21/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *Translation*.

DETAILED ACTION

Information Disclosure Statement

1. Document 1913910 has been received with the Reply dated 7/5/07. The IDS dated 10/21/04 has been initialed and signed. A copy of the IDS is included for Applicant's record.

2. A translation of DE 1903437 is also included for Applicant's record.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

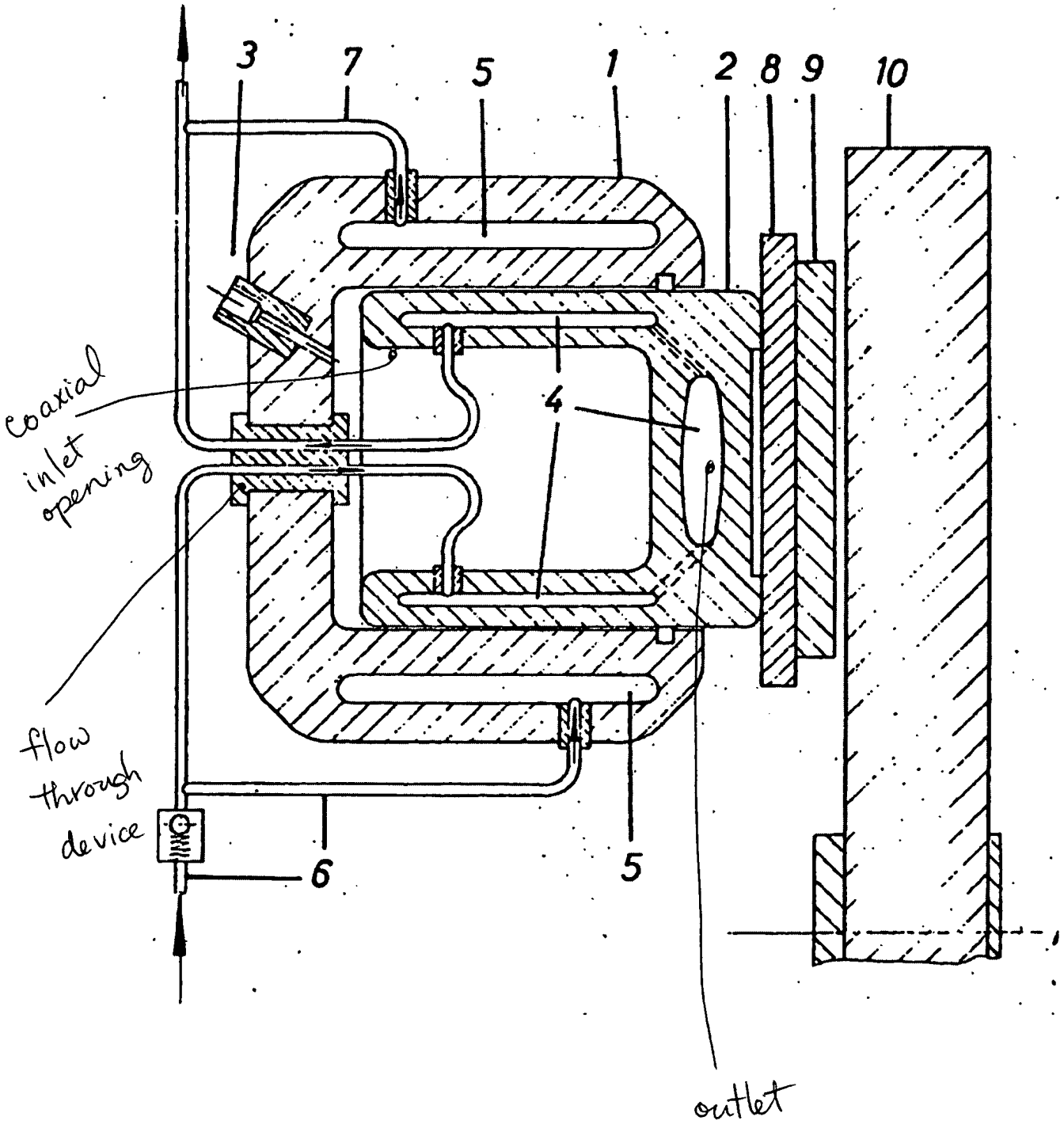
4. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuchs (DE 1903437) in view of Ross (US 4,440,270).

Re: claim 12, Fuchs shows a brake caliper in figure 1, as in the present invention, having a caliper wall, the caliper wall defining a cylinder 1 with at least one axially displaceable, hydraulically actuated piston 2 received in the cylinder, with which a brake pad 8, 9 can be pressed against a brake disc 10, the piston defining a cavity 4 therewithin, with at least one inlet opening for feeding a cooling medium into the cavity, the inlet opening being arranged in the piston spaced away from the brake pad, and at least one outlet opening arranged in the piston adjacent to the brake pad for discharging cooling medium from the cavity to adjacent the brake pad, as marked below, characterized in that a flow through device, as marked below, extends from the caliper wall into the interior space of the piston to allow passage of cooling medium from outside the caliper wall to the cavity, as shown. Fuchs provides examples of the cooling

medium such as oil and water but is silent about air. Ross teaches that cooling liquids and air are art recognized equivalents as cooling medium in brake cooling system in column 1, lines 12-21. Ross especially teaches the use of cooling air. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Fuchs' cooling system to employ air as taught by Ross to cool the disc brake since air and cooling liquids are art recognized equivalents as cooling media in brake cooling systems; and by using air, the weight of the vehicle would not be increased in order to accommodate extra cooling liquid.

Re: claim 13, Fuchs shows the flow through device to be integral with the wall of the brake caliper, as shown.

Re: claim 14, Fuchs also shows the piston comprises a hollow cylinder having a pair of face ends, wherein the brake pad 9 is located on one of the face ends and an inlet opening, as marked below, through which the flow-through device extends, is defined on the other face end, the inlet opening being coaxial to the cylinder, as shown below.


3
7
5
1
2
8
9
10
4
coaxial inlet opening
flow through device
6
5
outlet

Response to Arguments

5. Applicant's arguments filed 7/5/07 have been fully considered.

Applicant's amendments have overcome the 112, 2nd paragraph rejection.

Applicant's amendments necessitated the new ground of rejection based on Fuchs in view of Ross, wherein Ross is relied upon for the teaching of air and other liquids to be recognized as well-known art equivalents for their use as cooling media. Applicant also argues that Fuchs does not show the coaxial inlet opening. As marked above, the coaxial inlet opening where the cooling medium comes in the piston is shown to be coaxial with cylinder. Also, as marked above, the outlet is adjacent to the brake pad. As presented, claim 12 does not distinguish itself from the structure of the cooling system of Fuchs.

Applicant is correct that Cortanze is not prior art. The rejection has been withdrawn.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Nguyen whose telephone number is (571) 272-7121. The examiner can normally be reached on Monday through Friday, 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Siconolfi can be reached on (571) 272-7124. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Xuan Lan Nguyen/ 8/17/07
Primary Examiner
Art Unit 3683

10/501,619

PTO 2007-2995

PN=09833/1061
CY=DE
DATE=19700813
KIND=OLS

TRANSLATION DE 1903437

DISC BRAKES
[SCHEIBENBREMSE]

HUGO WILHELM FUCHS

UNITED STATES PATENT AND TRADEMARK OFFICE
Washington, D.C. March 2007

Translated by: Linguistic Systems, Inc.

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PRIORITY NUMBER	(31): NA
PRIORITY DATE	(32): NA
INVENTOR	(72): HUGO WILHELM FUCHS
APPLICANT	(71): KARL SCHMIDT GMBH
TITLE	(54): DISC BRAKES
FOREIGN TITLE	[54A]: SCHEIBENBREMSE

KARL SCHMIDT GMBH
7107 Neckarsulm

Frankfurt/M. January 21, 1969
DrQ/HGa

1903437

Prov. No.: 6043 KS

Disc Brakes

The invention is a cooled disc-brake mechanism, particularly for vehicles equipped with a hydraulic pressure cylinder containing a brake piston.

In disc brakes, in the view of many experts, there are best conditions for optimal stability in the braking mechanism because disc brakes have only a small "characteristic value," that is, a ratio of tangential force to clamping force of the brake pad slightly under one, so that the sensitivity to friction coefficient deviations is correspondingly small.

The disc brake is also afflicted with the disadvantage, however, that the problem of cooling speed and heat storage capacity has not been optimally solved up to now. If the greatest amount of heat created by the braking mechanism is given off through convection into the surrounding air, a certain amount is transferred to the neighboring disc brake components, which can lead to boiling of the brake fluid into the braking system in extreme cases.

In order to avoid high temperatures in the disc brake mechanism, it is proposed that an insulation layer surrounded by air be situated between the brake pad, as the point of origin of the heat, and the

brake piston (German patent document 877 076, German patent document 1 009 504). However, the amount of heat produced when braking is so great that this type of insulator layer is only a measure against the heat storage capacity of the disc brake mechanism. A further disadvantage occurs through the fact that the insulation layer leads to an undesirable large heat congestion in the caliper assembly as well as in the brake pad, so that so-called fading occurs, that is, when a certain temperature determined by the brake pad material is exceeded, the pad friction coefficient will also fall correspondingly.

It is also known (ATZ 63, 1, 1961, page 26) how to improve cooling of the disc brake through air with ribs radially arrayed correctly designed in accordance with fluid dynamics, or those running against the rotational direction, because the effective surface is enlarged in this manner and the thermal capacity is thereby increased (ATZ 61, 8, 1959, page 218).

In the attempt to conduct the heat created during braking and to keep the brake mechanism itself to a tolerable temperature, particular coolants are used as aids (ATZ 61, 8, 1959, page 218). In this way, in a water-cooled full disc brake, the internal cavity of the pressure disc is cooled behind the actual brake pad with surrounding water, whereby the cooling system of the brake is incorporated into the engine cooling system. The disadvantage of this fluid-cooled braking system is that the cooling effect is only

slightly greater than that of the air-cooled disc brakes with the cooling ribs.

The invention is based on the challenges of dissipating the friction heat in the brake caliper created in the brake pad via the brake drum, the brake piston, and the brake cylinder as quickly and efficiently as possible in order to avoid the damaging effects of heat on the braking system.

This challenge is solved by arranging single or multiple component cooling chambers in the head and/or shaft of the brake piston and/or in the use of the brake cylinder. These are charged with circulating a coolant supplied via the pipe and tube lines. In this way, the arrangement of the cooling chambers can occur in such a way that they are situated in succession or parallel to each other and have a continual flow of coolant.

The brake cylinder and the brake piston are created in an advantageous manner out of a material with a high heat conduction capacity.

Advantageously, the coolant for the disc brake mechanism is either derived from the actual braking system, such as in the form of hydraulic oil, or from the engine cooling system, water, for example, whereby the coolant removes the stored heat through its backflow from the cooling chambers in a particular cooling mechanism.

In the case that a particularly high cooling effect should be achieved, it is recommended that the coolant flow in a particular

cooling circuit.

An additional design of the invention designates that the circulation of the coolant is actuated with the start of the braking process through a brake strength amplifier.

Through the vents arranged in the coolant circuit, it can be effectuated that the cooling chambers as well as the tube and pipe lines for the in- and outflow of the coolant always remain filled with coolant.

An additional characteristic of the invention is that the cooling chambers of the brake piston are connected from the interior of the rotor and from the exterior of the brake cylinder by the coolant input and outflow lines.

In special cases, it may be advantageous that the cooling chambers be connected from the brake pistons and brake cylinders with the coolant input and outflow lines from the outside.

A design example of the invention is represented in the illustrations and is more closely elucidated as follows.

Illustrations:

Figure 1: a cross section through a disc brake mechanism, in which the piston head is level with the brake disc.

Figure 2: a cross section through a disc brake mechanism, in which the lower rotor opening is level with the brake disc.

Brake piston 2 is located in brake cylinder 1, which is situated over vent 3 in the brake cylinder, which is supplied with fluid. In the cladding of brake cylinder 1 as well as in the shaft and head of brake piston 2, there are one-piece cooling chambers 4 and 5, which are supplied with fluid via supply line 6, which is then transferred via supply line 7. Pursuant to figure 1, brake drum 8, on the anterior side of which acting brake pad 9 is fitted to brake disc 10, is connected to the head of the brake piston. The coolant line is connected from the interior of brake piston 2 with its cooling chambers 4 and/or from the exterior with cooling chambers 5 of brake cylinder 1. In figure 2, brake drum 8 is attached to brake pad 9, which adheres to brake disc 10 by the opening of brake piston 2, indicating brake disc 10. In this design, lines 6 and 7 for the coolant input and outflow for cooling chambers 4 and 5 for brake cylinder 1 and brake piston 2 are supplied from the exterior.

The advantages of the invention include the fact that, because of the sufficiently larger design of the coolant flow, the disc brake is in a position to be able to handle significantly greater heat capacities than previous disc brake designs.

Patent Claims

1. Cooled disc brake mechanism, in particular for motor vehicles that have a hydraulic pressure cylinder containing a brake piston, characterized by the fact that in the head and/or shaft of the brake piston (2) and/or in the sidewall of the brake cylinder (1) there are cooling chambers admitting coolant (4,5).
2. Cooled disc brake mechanism pursuant to claim 1, characterized by the fact that the brake cylinder (1) and brake piston (2) are constructed of a material with a high heat conduction capacity.
3. Cooled disc brake mechanism pursuant to claims 1 and 2, characterized by the fact that the cooling chambers (4,5) consist of one and/or multiple parts.
4. Cooled disc brake mechanism pursuant to claims 1-3, characterized by the fact that the cooling chambers (4,5) are arrayed in such a way that coolant flows through them successively.
5. Cooled disc brake mechanism pursuant to claims 1-3, characterized by the fact that the cooling chambers (4,5) are arrayed in such a way that the coolant flows through them in a parallel manner.
6. Cooled disc brake mechanism pursuant to claims 1-5, characterized by the fact that the cooling system is connected to the fluid circuit of the brake.

7. Cooled disc brake mechanism pursuant to claims 1-5, characterized by the fact that the cooling system is connected to the cool water circuit of the engine.

8. Cooled disc brake mechanism pursuant to claims 1-5, characterized by the fact that the cooling system consists of its own proprietary cooling circuit.

9. Cooled disc brake mechanism pursuant to claims 1-8, characterized by the fact that the cooling chambers (4) are connected to the brake piston (2) from the interior of the rotor and that the cooling chambers of the brake cylinder (1) are connected to the coolant supply and outflow line from the exterior.

10. Cooled disc brake mechanism pursuant to claims 1-8, characterized by the fact that the cooling chambers (4,5) of the brake piston (2) and the brake cylinder (1) are both connected to the coolant supply and outflow line from the exterior.

(2 figures to follow)

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G3 c 21-10 AT: 24.01.1969 OT: 13.08.1970

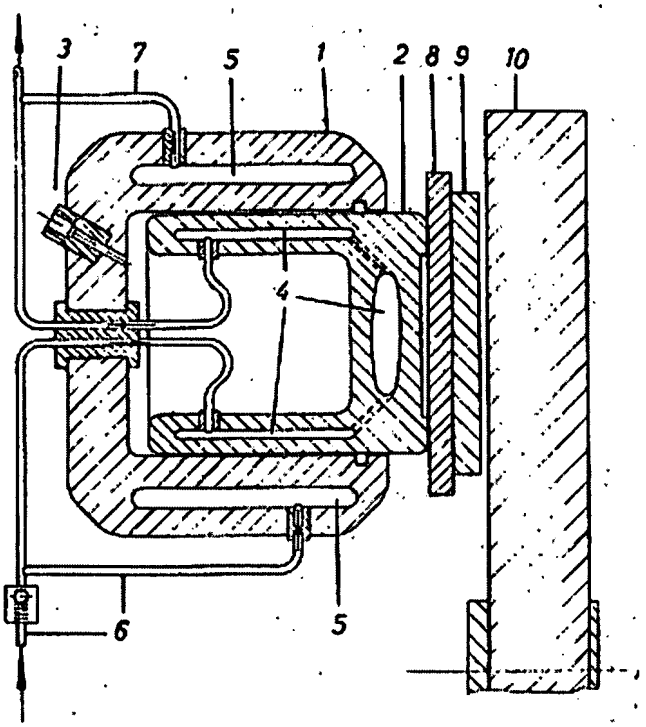

Fig. 1

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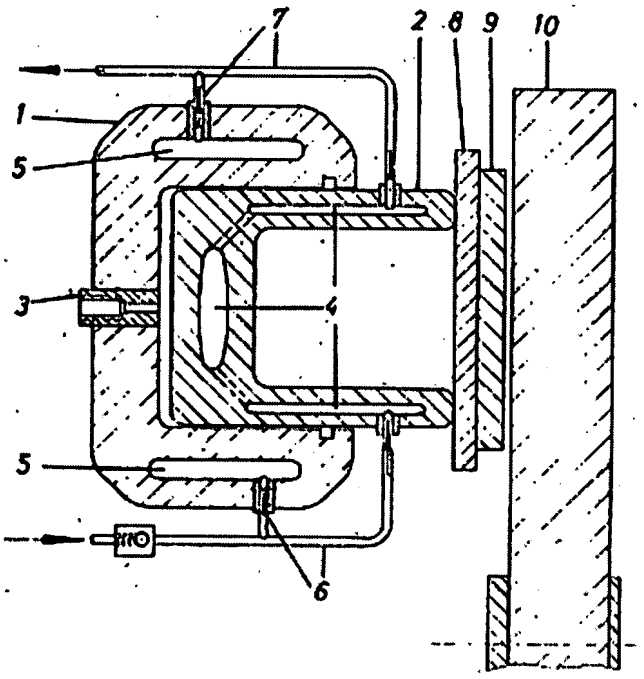

Fig. 2